

WHAT IS CLAIMED IS:

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1 1. An implantable prosthesis, comprising:  
2 a body structure having an outer surface capable of contacting a surface of  
3 a vascular lumen;  
4 a plurality of grooves defined on said outer surface of said body structure;  
5 and  
6 filament portions containing a therapeutic substance disposed in said  
7 plurality of grooves.

1 2. The implantable prosthesis of Claim 1, wherein each of said  
2 plurality of grooves has a preselected and controlled distribution and a preselected  
3 and controlled depth.

1 3. The implantable prosthesis of Claim 2, wherein said preselected and  
2 controlled depth is equal to about 10% to 90% of a thickness of said body  
3 structure.

1 4. The implantable prosthesis of Claim 2, wherein said preselected and  
2 controlled depth is not greater than about 65% of a thickness of said body  
3 structure.

1           5.       The implantable prosthesis of Claim 1, wherein each of said  
2 plurality of grooves are open ended.

1           6.       The implantable prosthesis of Claim 1, wherein said plurality of  
2 grooves are formed by exposing said outer surface to an energy discharge from a  
3 laser.

1           7.       The implantable prosthesis of Claim 1, wherein each of said  
2 plurality of grooves are formed in rows extending approximately perpendicular to a  
3 central longitudinal axis of said body structure.

1           8.       The implantable prosthesis of Claim 1, wherein each of said  
2 filament portions comprise a polymer material.

1           9.       The implantable prosthesis of Claim 1, wherein said therapeutic  
2 substance comprises a substance selected from the group consisting of  
3 antineoplastic, antiplatelet, anticoagulant, fibrinolytics, antimitotic, thrombin  
4 inhibitor, antiinflammatory, and antiproliferative agents.

1           10.      The implantable prosthesis of Claim 1, wherein said therapeutic  
2 substance comprises a radioactive isotope.

1           11.      The implantable prosthesis of Claim 1, further comprising a barrier  
2 formed on said outer surface of said body structure, wherein said barrier covers

3 each of said plurality of grooves to reduce the rate at which said therapeutic  
4 substance is released.

1 12. An implantable prosthesis, comprising:  
2 a body structure having an outer surface capable of contacting a surface of  
3 a vascular lumen;  
4 a plurality of grooves defined on said outer surface; and  
5 a polymeric substance containing a therapeutic substance disposed in said  
6 plurality of grooves.

1 13. A method of loading a substance into a body of an implantable  
2 prosthesis, comprising:  
3 providing a body structure having an outer surface capable of contacting a  
4 vascular lumen surface;  
5 forming grooves on said outer surface of said body structure; and  
6 positioning a monofilament including a therapeutic substance in said  
7 grooves.

1 14. The method according to Claim 13, wherein said positioning  
2 comprises winding a monofilament around said body structure to rest in said  
3 grooves.

1           15.    The method according to Claim 14, further comprising removing  
2 portions of said monofilament extending outside of said grooves.

1           16.    The method according to Claim 13, further comprising forming a  
2 barrier on said lumen contacting surface of said body structure for releasing said  
3 therapeutic substance at a controlled rate.

1           17.    The method according to Claim 13, wherein said grooves comprise  
2 open ended trenches extending substantially perpendicular to a central axis of said  
3 body structure.

1           18.    The method according to Claim 13, wherein said therapeutic  
2 substance comprises a substance selected from the group consisting of  
3 antineoplastic, antiplatelet, anticoagulant, fibrinolytics, antimitotic, thrombin  
4 inhibitor, anti-inflammatory, and antiproliferative substances.

1           19.    The method according to Claim 13, wherein said monofilament  
2 comprises a polymer material including polyurethane blended with 10%-30%  
3 dexamethasone.

1           20.    An implantable prosthesis, comprising:  
2           a body structure having an outer surface capable of contacting a surface of  
3 a vascular lumen;  
4           a plurality of open-ended trenches defined on said outer surface; and

- 5 a portion of a microfilament containing a therapeutic substance disposed in  
6 said plurality of trenches.

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